
County of Los Angeles • Department of Health Services
Public Health
Acute Communicable Disease Control
Special Studies Report 2000

GROUP A STREPTOCOCCAL INVASIVE DISEASE

BACKGROUND

Group A Streptococcus (GAS), *Streptococcus pyogenes*, a common cause of pharyngitis and uncomplicated skin and soft tissue infections, can also cause serious invasive disease. In the late 1980s, reports of severe invasive GAS infections, including streptococcal toxic shock syndrome and necrotizing fasciitis, began to appear with increasing frequency worldwide. Various theories have been offered to explain the apparent increase and severity of streptococcal infections in recent years, including possible changes in virulence of circulating strains and changes in host susceptibility. GAS invasive disease is not a legislatively-mandated reportable disease in California. Following a cluster of severe invasive GAS infections in previously healthy children in Southern California in 1993, the Acute Communicable Disease Control Unit requested reporting of GAS invasive disease from laboratories, hospitals, and health-care providers in Los Angeles County.

METHODS

GAS invasive disease is defined as isolation of *Streptococcus pyogenes* from a normally sterile body site (blood, cerebrospinal fluid, pleural fluid, peritoneal fluid, bone, joint fluid, or from tissue collected during surgical procedures). GAS invasive disease includes three potentially overlapping clinical syndromes:

Streptococcal toxic shock syndrome (STSS) - characterized by early shock and multiorgan system failure;

Necrotizing fasciitis (NF) -necrosis of subcutaneous soft tissue and skin with signs of severe systemic disease;

Sterile site infections that do not meet the clinical criteria for STSS or NF, including nonfocal bacteremia, and focal infections (e.g., meningitis, pneumonia, peritonitis, osteomyelitis, septic arthritis, and deep soft tissue infections) with or without bacteremia.

Since reporting of GAS invasive disease was initiated in 1994, surveillance methods have varied from mainly passive during 1994 and most of 1995 to county-wide active surveillance between September 1995 and July 1996. Since July 1996, the Communicable Disease Active Surveillance Project (CDAS) has conducted stimulated passive surveillance for GAS invasive diseases, along with several other nonmandated reportable diseases of Public Health importance, in approximately 60% of laboratories and hospitals in LAC.

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RESULTS

In 2000, 154 cases of GAS invasive disease were reported, for a crude incidence rate of 1.67 cases per 100,000 population. Thirty-one reports of skin/soft tissue infections were excluded because they did not meet the case definition for invasive disease. Of 61 cases for which outcome was known, there were 13 deaths, for an estimated case fatality rate of 21%. The frequencies of total GAS invasive disease, STSS and NF cases for years 1994-2000 are shown in Table 1.

**Table 1. Frequency of Invasive GAS, STSS and NF
Los Angeles County, 1994-2000**

Year	Invasive GAS	STSS		NF	
		N	(%)	N	(%)
1994	83	29	(35)	18	(22)
1995	103	16	(16)	17	(17)
1996	175	9	(5)	13	(7)
1997	205	7	(3)	9	(4)
1998	128	8	(6)	13	(10)
1999	114	6	(5)	11	(10)
2000	154	8	(5)	20	(13)

Focus of Infection: Approximately half (50%) of invasive GAS disease were bacteremia cases without other identified focuses of infection. (Table 2).

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**Table 2. Clinical Features Associated with Invasive GAS Disease Cases
Los Angeles County, 2000 (N = 154)**

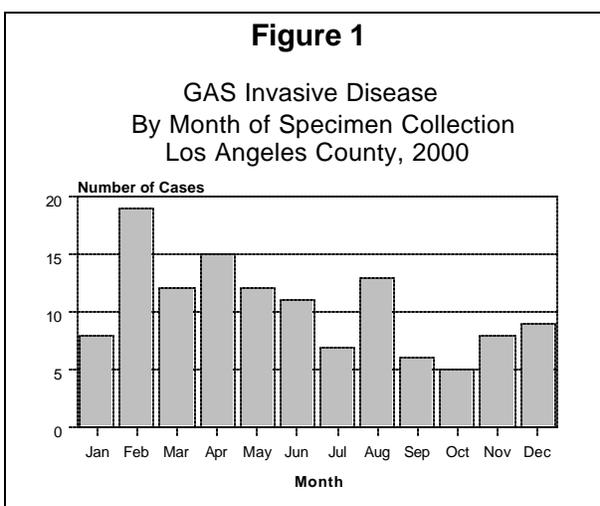
Focus of Infection	No. of patients* (%)	Age (yr) Median Range	Death No. (%)**
Skin-soft tissue infection			
Necrotizing fasciitis	20 (13)	54 (12-90)	4/13 (31)
Other	25 (16)	43 (0.6-88)	2/9 (22)
Toxic Shock Syndrome (TSS)	8 (5)	36 (4-68)	1/7 (14)
Pneumonia	12 (8)	44 (2-84)	0/8 (0)
Septic arthritis/osteomyelitis	14 (9)	40 (3-81)	0/6 (0)
Bacteremia (without septic focus)	77 (50)	56 (0.04-92)	6/21 (29)
Endocarditis	1(0.6)	22	0/0
Total	154	52 (0.04-92)	13/61 (21)

*Categories are not mutually exclusive. Two necrotizing fasciitis cases also had TSS and one septic arthritis also had TSS.

**Calculated only for those cases with available outcome data.

Seasonality: Cases occurred throughout the year but were more frequent during the winter and spring months (Figure 1). The pronounced winter/spring seasonality commonly associated with noninvasive GAS infections, however, was not observed.

Age, Gender, Race/Ethnicity: The mean age of invasive GAS cases for which age data were available (n=153) was 48 years (median 52 years, range 7 days to 92 years). There were slightly more male cases (82) than female cases (71). Race/ethnicity data were available for 95 cases. Of these, 48 (51%) were non-Hispanic White, 37 (39%) were Hispanic, 7 (7%) were Asian, and 3 (3%) were Black.



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Necrotizing Fasciitis: NF was reported in 20 (13%) cases; 14 (70%) of the cases were male. The mean age of NF cases was 54 years (median 54 years, range 12-90 years). Outcome was reported for 13 of the 20 NF cases with a case fatality rate of 31% (4/13). Two patients with NF were also diagnosed with streptococcal toxic shock syndrome.

COMMENTS

These data are subject to several limitations. First, changes in surveillance methods over the study period make meaningful year-to-year comparisons difficult. Completeness of invasive GAS reporting in LAC has not been assessed. The Center for Disease Control and Prevention estimates that the national incidence rate of invasive GAS disease is 1.5-3.5 cases per 100,000 population, compared to the LAC rate of 1.67 cases per 100,000 in 2000. Second, invasive GAS surveillance is mainly laboratory-based and detailed demographic and clinical data are rarely included with the initial report. Hospital record review of reported invasive GAS cases would have provided more complete data but was done for only a small number of cases. It is likely that the number of deaths and the occurrence of additional foci of infections in bacteremic cases are substantially underestimated.

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